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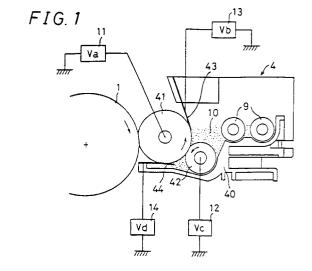
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## (54) Developing apparatus using one-component toner

(57)An object of the present invention is to prevent an electrical breakdown of a toner layer and an occurrence of overcurrent, thereby preventing quality of image from being degraded at the time of development, when development with one-component toner is conducted using a developing roller of low resistance. The resistance value Rd of a developing roller (41) which carries and conveys one-component toner (10) in a manner of coming into contact with a photoconductor (1) which bears an electrostatic latent image, is defined as Rd =  $\rho d \cdot (Dd1/S1)$ , wherein S1 (cm<sup>2</sup>) is an area in which the developing roller (41) comes into contact with the static image bearing member via a toner layer (45), Dd1 (cm) is a layer thickness of a semiconductive layer which composes the developing roller, and pd ( $\Omega \cdot cm$ ) is a volume resistivity thereof. The range of the resistance Rd is set as  $10^4 < Rd < 10^5$  and the resistance Rt  $(\Omega)$  of the toner layer is set as Rt > 5  $\times$  10<sup>7</sup>. By using the developing roller (41) of low resistance, excellent development is realized and an electrical breakdown and an overcurrent can be avoided by the resistance value of the toner layer.





## **EUROPEAN SEARCH REPORT**

Application Number EP 99 10 3588

Category	Citation of document with indication, of relevant passages	where appropriate,	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	PATENT ABSTRACTS OF JAPAN vol. 1995, no. 02, 31 March 1995 (1995-03-31 & JP 06 324558 A (FUJITSU 25 November 1994 (1994-11 * abstract *	)   LTD),		G03G15/08
Α	EP 0 390 605 A (TOKYO SHI ;TOKYO ELECTRIC CO LTD (J 3 October 1990 (1990-10-0 * page 9, line 42 - page	(P)) (3)		
A	PATENT ABSTRACTS OF JAPAN vol. 006, no. 141 (P-131) 30 July 1982 (1982-07-30) & JP 57 064254 A (RICOH C 19 April 1982 (1982-04-19 * abstract *	0 LTD),		
				TECHNICAL FIELDS SEARCHED (Int.Cl.6)
				G03G
	The present search report has been draw			
	Place of search THE HAGUE	Date of completion of the search  7 September 2000	do	Examiner Vries A
X : part Y : part docu A : tech	ATEGORY OF CITED DOCUMENTS  icularly relevant if taken alone icularly relevant if combined with another unent of the same category inological background —written disclosure	T : theory or principle u E : earlier patent docun after the filing date D : document cited in th L : document cited for c	nderlying the inent, but publication opther reasons	

## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 99 10 3588

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

07-09-2000

JP 2259773 A 22-10- JP 2953664 B 27-09- JP 2259785 A 22-10- JP 2259786 A 22-10- JP 2992293 B 20-12- DE 69015403 D 09-02- DE 69015403 T 13-07- KR 9308608 B 10-09- US 5110705 A 05-05- JP 2809794 B 15-10-	EP 0390605 A 03-10-1990 JP 2259783 A 22-10- JP 2259773 A 22-10- JP 2953664 B 27-09- JP 2259785 A 22-10- JP 2259786 A 22-10- JP 2992293 B 20-12- DE 69015403 D 09-02- DE 69015403 T 13-07- KR 9308608 B 10-09- US 5110705 A 05-05- JP 2809794 B 15-10- JP 3087759 A 12-04-	cit	Patent document ed in search repo	rt	Publication date	Patent family member(s)	Publication date
JP 2259773 A 22-10- JP 2953664 B 27-09- JP 2259785 A 22-10- JP 2259786 A 22-10- JP 2992293 B 20-12- DE 69015403 D 09-02- DE 69015403 T 13-07- KR 9308608 B 10-09- US 5110705 A 05-05- JP 2809794 B 15-10- JP 3087759 A 12-04-	JP 2259773 A 22-10- JP 2953664 B 27-09- JP 2259785 A 22-10- JP 2259786 A 22-10- JP 2992293 B 20-12- DE 69015403 D 09-02- DE 69015403 T 13-07- KR 9308608 B 10-09- US 5110705 A 05-05- JP 2809794 B 15-10- JP 3087759 A 12-04-	JP	06324558	Α	25-11-1994	NONE	
JP 57064254 A 19-04-1982 NONE	JP 57064254 A 19-04-1982 NONE	EP	0390605	A	03-10-1990	JP 2259773 A JP 2953664 B JP 2259785 A JP 2259786 A JP 2992293 B DE 69015403 D DE 69015403 T KR 9308608 B US 5110705 A JP 2809794 B	22-10-1 22-10-1 27-09-1 22-10-1 22-10-1 20-12-1 09-02-1 13-07-1 10-09-1 05-05-1 15-10-1
		 JP	 57064254	 A	19-04-1982		